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Type locality and distribution of *Mesapia peloria* (Hewitson, 1853) (Lepidoptera, Pieridae)

Teruo TADOKORO[1)], WANG Min[2)], Yuichi KOIDE[3)] and Katsuhiko HORI[4)]

[1)] 7-5-35 Kinuta, Setagaya-ku, Tokyo, 157-0073 Japan
[2)] Laboratory of Insect Ecology, South China Agricultural University, Guangzhou, China
[3)] 4813-1, Sakura-machi, Numata, Gunma, 378-0052 Japan
[4)] 5497-1, Toyoshina, Azumino, Nagano, 399-8205 Japan

Abstract Tadokoro *et al.* (2014) reviewed intraspecific classification of *Mesapia peloria* (Hewitson, 1853), and drew a preliminary distribution map of distinct local subspecies, but could not complete the map due to lack of specimens. In this paper, we place more precisely the venue of the type locality, vaguely described as "at great elevation on the mountains of Chinese Tartary", and update the distribution map of this butterfly. *M. p. wymanni* Ziegler, 2007 is synonymized with *M. p. lama* (Alphéraky, 1887).

Key words Chinese Tartary, distribution, *Mesapia peloria, Mesapia peloria epsteina, Mesapia peloria lama, Mesapia peloria minima*, morphology, Tibet.

Introduction

Mesapia peloria (Hewitson, 1853) is a little white Pierid butterfly inhabiting high mountainous area (alt. 3,000-5,000m) in W. China and the Himalayas, and is the only species belonging to the genus *Mesapia* Gray, 1856. Tadokoro *et al.* (2014) reviewed intraspecific classification of this butterfly and highlighted three local subspecies distinguished by their wing markings. They are ssp. *peloria*, ssp. *lama* and ssp. *epsteina* Tadokoro *et al.*, 2014. Both ssp. *grayi* Bang-Has, 1934 and ssp. *tibetensis* D'Abrera, 1990 were considered to be synonyms of ssp. *lama*. Tadokoro *et al.* (2014) inferred that "Mts of Chinese Tartary", the type locality of the nominotypical form of *M. peloria*, might be in the mountains of Tibet instead of the Qilian-shan as historically considered, but did not reach a conclusion due to lack of specimens from the Tibetan mountains. Recently we obtained specimens from six local populations of *M. peloria* from the mountainous regions of Tibet, and here we try to ascertain the venue of the type locality, judging from their wing markings. In this paper, we follow Della Bruna *et al.* (2013) in treating this species as belonging to the monotypic genus *Mesapia*, although genetic research currently carried out elsewhere may in due course preclude its separation from the closely-related genus *Aporia* Hübner, 1819.

Materials and methods

A preliminary distribution map of *M. peloria* (Fig. 1) was given in Tadokoro *et al.* (2014). Specimens were obtained from reliable sources with detailed collecting data. Specimens-A (Fig. 2-A) are from Ta-La (Alt. 4,600m), specimens-B (Fig. 2-B) are from Monda-La (alt. 4,700m), specimens-C (Fig. 2-C) are from Turphu/特夫 (Alt. 3,850m) and specimens-D (Fig. 2-D) are from Damxung/当雄 (Alt. 4,000-4,300m), which are all located in South-central Tibet (Fig. 1). Specimen-E (Fig. 3-E) is from Poshula-Ling (Alt. 4,600-5,000m) in S. E. Tibet, and specimen-F (Fig. 3-F) is from Baima Xue-shan/白馬雪山 (Alt. 4,300-5,000m) in Yunnan. Those six local populations are compared with the following four subspecies by consideration of their wing markings and dimensions.

Specimen-G (Fig. 4) represents ssp. *peloria* which is from Xiaojin /小 金 (Alt. 4,500m) in Sichuan collected on 2 VII 2001. Specimen-H (Fig. 5) represents ssp. *lama* from Qinghai at Ngola-shankou (Alt. 3,620m) collected on 28 VI 2009. Specimen-I (Fig. 6) is the type specimen of ssp. *epsteina* from central Nepal. In addition to the actual specimens above, the figure of ssp. *peloria* ♂ (Fig. 7) was studied from Hewitson (1853), the type specimens of ssp. *peloria* (Fig. 8) in NHM (BMNH) was studied from Ziegler (2007) and the type specimens of ssp. *minima* Huang, 1995 (Fig. 9) was stidied from Huang (1995).

Results and discussion

Latest classification and available taxa of M. peloria *in 2015*:

Della Bruna *et al.* (2013) treated ssp. *leechi* Bang-Haas, 1934 from Sichuan as a synonym of ssp. *peloria*, and also treated ssp. *wymanni* Ziegler, 2007 from N. W.

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Qilian-shan as a synonym of ssp. *grayi* Bang-Haas, 1934. We have no critical objection to the taxonomic treatment above so far with the following comments:

- Ssp. *leechi*: If its type locality "Szetschwan, Bango, Ginfu-shan" refers to somewhere in S. E. Tibet as "Sichuan" normally refers, ssp. *leechi* is to be treated as a synonym of ssp. *peloria* as specimen-G (Fig. 4) clearly indicates. A minor characteristics appearing in the Sichuan population may be the thick yellow ground colour on the hw underside, which will be discussed later. Ziegler (2007) treated ssp. *leechi* as a synonym of ssp. *peloria* as well.

- Ssp. *wymanni*: We agree that wing markings in the male resemble ssp. *grayi*. If the fw ground colour in the female has wide variations, ssp. *wymanni* can be treated as a synonym of ssp. *grayi*. Here we treat ssp. *grayi* as a synonym of ssp. *lama* following Ziegler (2007), and so ssp. *wymanni* is to be placed as a synonym of ssp. *lama* in this paper.

Thereafter, four local subspecies remain as available taxa. They are ssp. *peloria*, ssp. *lama*, ssp. *minima* and ssp. *epsteina*.

Distinct wing markings of the four local subspecies:

Distinct wing markings mainly appear on the male's upper side wings. The guidelines of identification in males are as follows:

1. Ssp. *peloria* - Hw subcostal vein and vein 7 suffused by black scales (a) but not as thick as ssp. *epsteina*, and discal spot in hw cell (b) invisible (Figs 7 & 8) or very faint. (Fig. 4).
TL: Mts of Chinese Tartary [Tadokoro *et al.* (2014) tentatively located as Sichuan.]

2. Ssp. *lama* - Discal spot in hw cell prominent (b). (Fig. 5)
TL: N. E. Tibet (Qinghai, Gansu)

3. Ssp. *epsteina* - Hw subcostal vein and vein 7 thickly suffused by black scales (a), discal spot in hw cell (b) not as prominent as ssp. *lama*. (Fig. 6)
TL: Central Nepal (Southern slope of the Himalayas)

4. Ssp. *minima* –Wing marking resembling ssp. *peloria*, but wing size small. (LF=12.5~18 mm). (Fig. 9)
TL: Xiagangjiang Mts, (S. W. Tibet = Northern slope of the Himalayas)

For females, ssp. *lama* (Fig. 5) can be identified if the discal spot in hw cell is prominent (b) and base colour in forewing is pinkish (c), while both ssp. *peloria* (Fig. 8) and ssp. *epsteina* (Fig. 6) are rather orange tinted (c). Subspecies *epsteina* can be distinguished from ssp. *peloria* because in ssp. *epsteina* inside the fw cubital vein laid no transparent zone adjacent to the vain (d).

Identification of specimens from central Tibet:

A: From Ta-La (Alt. 4,600m), 30km N. of Tsona /錯那/ 27 VII, 001. (Figs 1 & 2-A)
Wing expanses in males are as large as 38-44mm (LF=20-23mm) with the average of 43mm in six males, but as small in female as 35mm (LF=19mm). Discal spot in hw cell invisible (b) in five males among six, while one male very faint. Overall wing markings perfectly match with ssp. *peloria* (Figs 4, 7 & 8).

B: From Monda-La (alt. 4,700 m), N. slope of Mts Kula Kangri / 27 VI, 2000. (Figs 1 & 2-B)
Wing expanses are as small as 35mm (LF=19 mm) in both male and female. Wing markings (a) & (b) match with ssp. *peloria*. LF (Forewing lengths) are smaller than the average in ssp. *peloria*, but still exceed the range in ssp. *minima* as 12.5~18 mm. This specimen can be identified as ssp. *peloria* (Figs 4, 7 & 8) rather than ssp. *minima* (Fig. 9).

C: From Turphu /特 夫 (Alt. 3,850 m) North of Lhasa / 14 VII, 2005. (Figs 1 & 2-C)
Wing expanses are 37-42mm (LF=20-22mm) in three males. Wing markings (a & b) match with ssp. *peloria* (Figs 4, 7 & 8).

D: From Damxung /当 雄 (Alt. 4,000-4,300m) / 3 VII, 1993 and 6 VII, 1994. (Figs 1 & 2-D)
Wing expanses are 37 mm (LF= 20mm) in two males and 39-40mm (20-21mm) in two females. Discal spot in hw cell thick, but not as prominent as in ssp. *lama* (b). Vein 7 thickly suffused by black scales, but not as prominent as in ssp. *epsteina* (a). The population from Damxung seems to have wide variations in wing markings. This specimen can be identified as ssp. *peloria* (Figs 4, 7 & 8) rather than ssp. *lama* (Fig. 5) or ssp. *epsteina* (Fig. 6).

After careful observation, all specimens A, B, C and D from South-central Tibet are identified as ssp. *peloria*. Significantly, the specimens-A from Ta-La (Fig. 2-A) perfectly match with the figured specimens of ssp. *peloria* (Figs 7 & 8) in terms of wing markings and wing expanses.

Identification of the specimens from S. E. Tibet:

E: From Poshula-Ling (Alt. 4,600-5,000m), South of Baxoi/八宿. 20 VI 1990 (Figs 1 & 3-E)

Wing expanse is 40.0mm (LF=21.0mm) in male.

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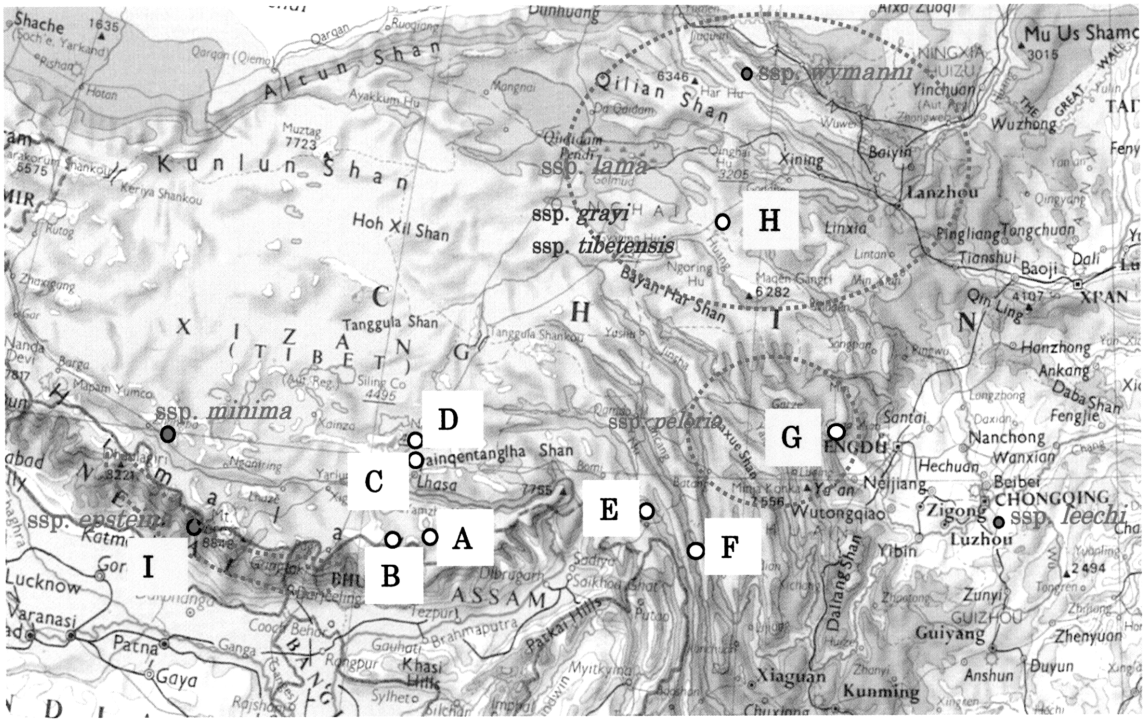
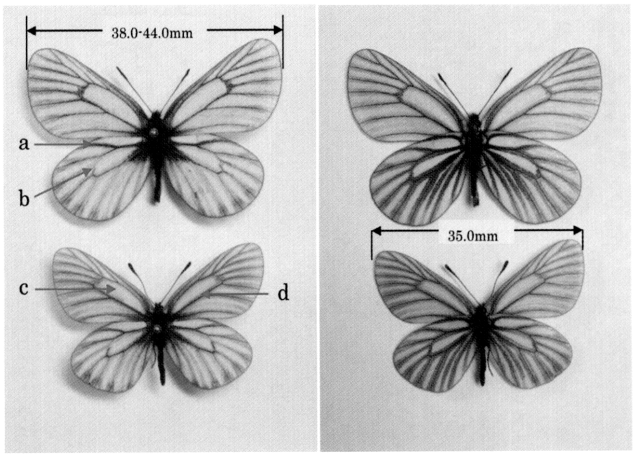
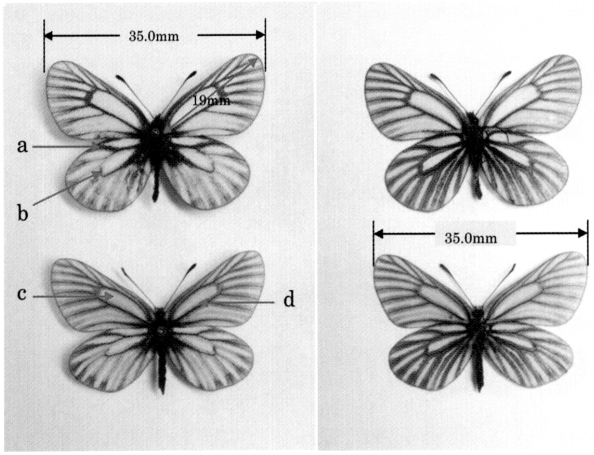


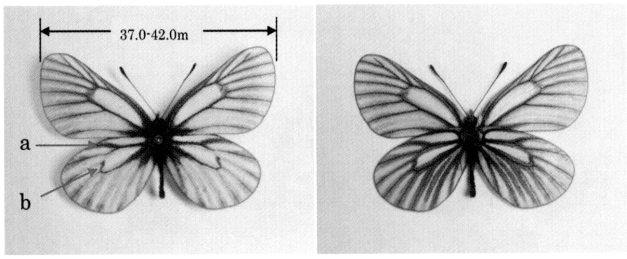
Fig. 1. Preliminary distribution map of *M. peliria* [After Tadokoro *et al.* (2014)], and collecting points of the specimens.



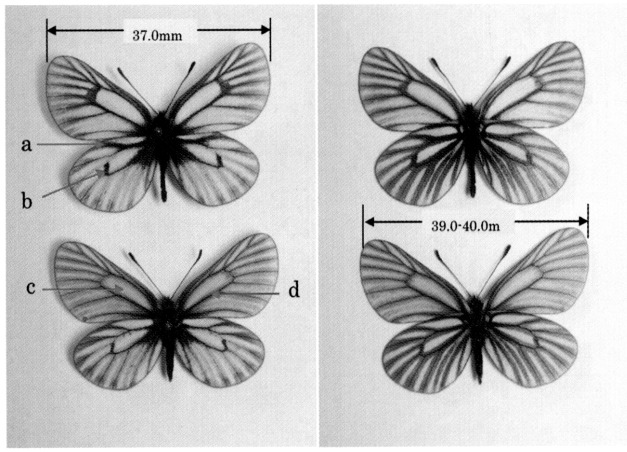
Specimen-A Ta-La in central Tibet (up: ♂, un: ♀)



Specimen-B Monda-La in central Tibet (up: ♂, un: ♀)



Specimen-C Turphu in central Tibet ♂



Specimen-D Damxung in central Tibet (up: ♂, un: ♀)

Fig. 2. Specimens from central Tibet.

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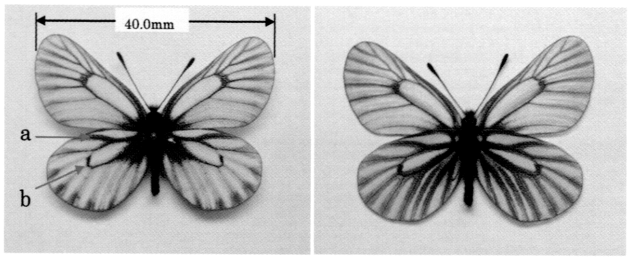
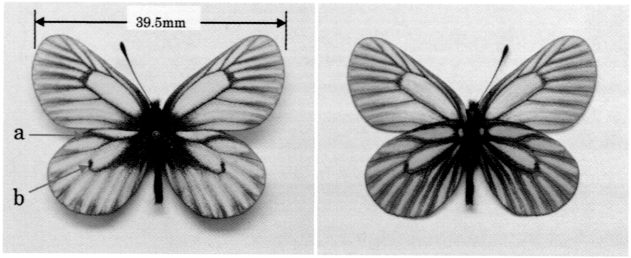


Specimen-E. Poshula-Ling, South of Baxoi in S. E. Tibet ♂



Specimen-F Baima Xueshan, Yunnan ♂

Fig. 3. Specimens from E. Tibet.

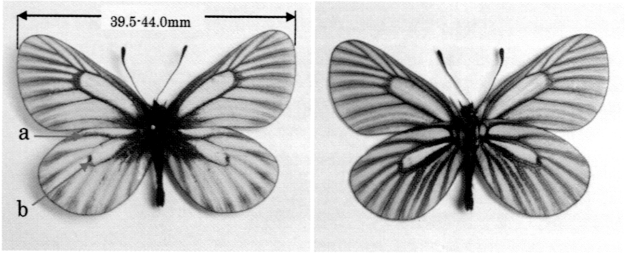


Fig. 4. ssp. *peloria* ♂ from Sichuan.

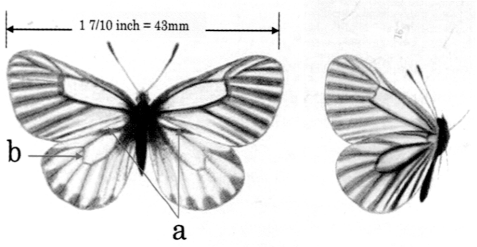
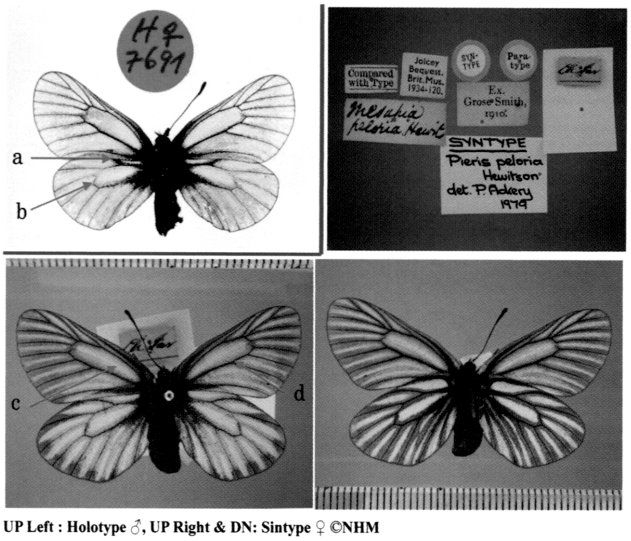


Fig. 7. ssp. *peloria* ♂ Figure [After Hewitson (1853)].



UP Left : Holotype ♂, UP Right & DN: Sintype ♀ ©NHM

Fig. 8. ssp. *peloria* ♂& ♀ Type specimens ©NHM (BMNH).

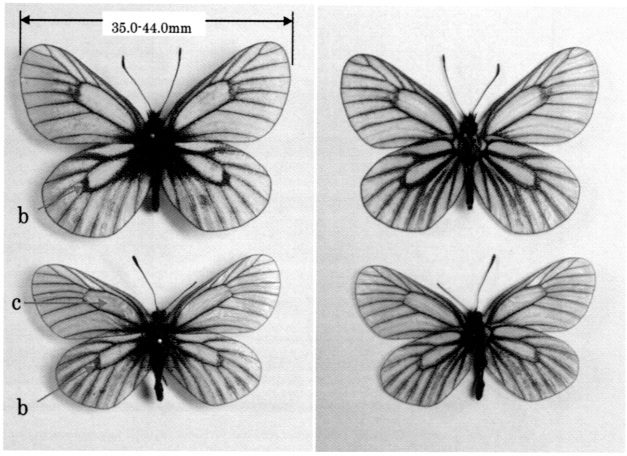


Fig. 5. ssp. *lama* ♂& ♀ from Qinghai.

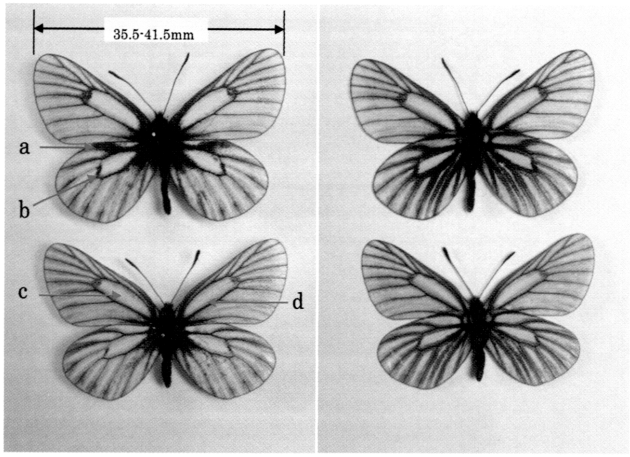
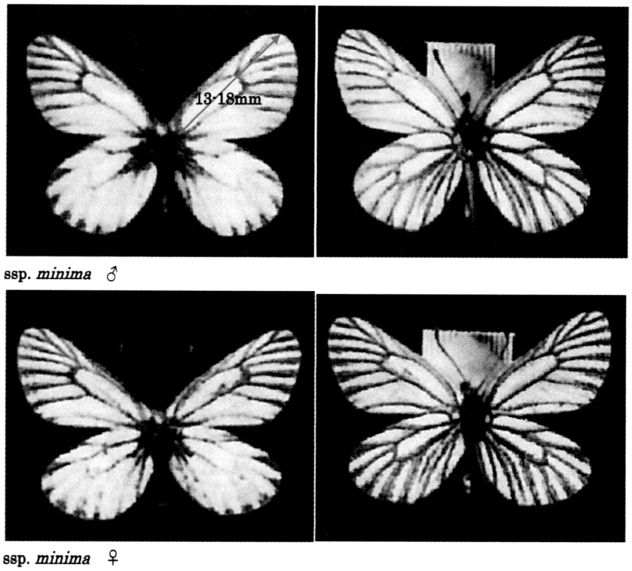


Fig. 6. ssp. *epsteina* ♂& ♀ Type specimens ©Univ. Museum, Univ. of Tokyo.



ssp. *minima* ♂

ssp. *minima* ♀

Fig. 9. ssp. *minima* ♂& ♀ Type specimens [After Huang (1995)].

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Fig. 10. Chinese Tartary in 1806 [After Cary (1811)].

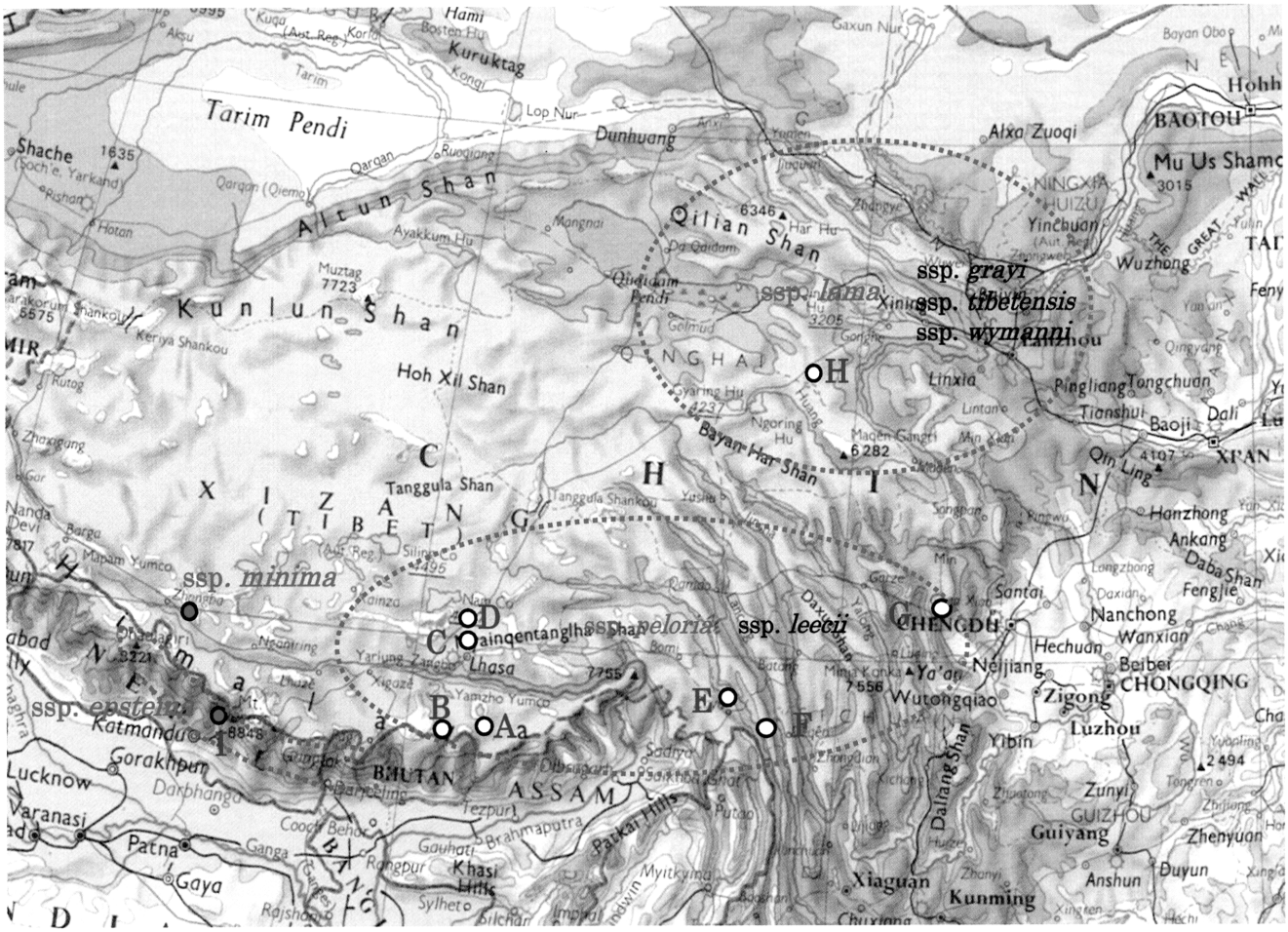

Fig. 11. Updated distribution map of *M. peloria*.

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Wing markings (a & b) match with ssp. *peloria* (Figs 4, 7 & 8).

F: From Baima Xueshan/白馬雪山 (Alt: 4,300-5,000) in Yunnan, 13 VI 1990 (Figs 1 & 3-F)
Wing expanse is 39.5mm (LF=21.0mm) in male.

Although wing form is rounded and the ground color in hw underside is thick canary yellow, wing markings (a & b) match with ssp. *peloria* (Figs 4, 7 & 8).

The populations from S. E. Tibet (Specimens-E, F & G) seem to have a thick yellow ground color on the hw underside, compared to the populations from central Tibet. However, we give little taxonomic distinction to this coloration and include those two specimens in ssp. *peloria*, on the basis of their wing markings.

Conclusion

Type locality‘ *Mts of Chinese Tartary*”:

The vaguely described type locality of *M. peloria* as “Mts of Chinese Tartary”, is archaic English especially used during the time of the Qing Dynasty, and may refer to Xinjiang, Mongolia, Manchuria, Qinghai (Kokonor) or Tibet (Fig. 10). The type locality of *M. peloria* has traditionally been considered as Qilian-shan in Kokonor, after Alphéraky (1889) agreed that his newly described *Apolia lama* Alphéraky, 1887 from N. E. Tibet was the same butterfly as *M. peloria*. Since then, both Röber (1906) and Verity (1905-1911) treated ssp. *lama* from Qilian-san as ssp. *peloria*. Della Bruna *et al.* (2013) and Ziegler (2015) still consider that the “Mts of Chinese Tartary” refer to Qilian-shan. However, the wing markings of the population from N. E. Tibet (Fig. 5), are apparentry distinct from the type specimens and from the original figure of *M. peloria* (Figs 7 & 8) especially by the prominent discal spot on the hw upperside (b). Judging from the results that all of seven local populations (specimen A-G) from central Tibet to S. E. Tibet (Sichuan) are identified as ssp. *peloria*, it is apparent that “Mts of Chinese Tartary” as the type locality of *M. peloria* refers to the mountains of Tibet instead of Qilian-shan as historically considered. Comparing wing markings and wing expanses of those seven local populations of ssp. *peloria*, the specimens-A from Ta-La, the central Tibet (Fig. 2-A) perfectly match with the type specimen of ssp. *peloria* (Figs 7 & 8).

Distribution of Mesapia peloria:

Figure 11 is an updated distribution map of four local subspecies of *Mesapia peloria*. Ssp. *peloria* is distributed along the Tibetan mountains, while ssp. *lama* is distributed in N. E. Tibet and Qiliang-shan. Ssp. *epsteina* is distributed along with southern slope of the Himalayas, while ssp. *minima* is found in an isolated area at S. W. Tibet.

Classification :

We summarize the present taxonomic phylogeny of *Mesapia peloria* as follows :

Species : *Mesapia peloria*

Subspecies : *peloria* (Hewitson, 1853)

= *leechi* Bang-Haas, 1934 : synonymized by Ziegler (2007)

Subspecies : *lama* (Alphéraky, 1887)

= *grayi* Bang-Haas, 1934 : synonymized by Ziegler (2007)

= *tibetensis* D’Abrera, 1990 : synonymized by Tadokoro *et al.* (2014)

= *wymanni* Ziegler, 2007 syn. nov.

Subspecies : *minima* Huang, 1995

Subspecies : *epsteina* Tadokoro, Koide and Hori, 2014.

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References

Alphéraky, S., 1889. Lépidopteres rapportés du Thibet par le General N. M. Prezewalsky de son voyage de 1884-1885. *Mém. lép.* **5**: 59-89.

Cary, J. 1811. Cary's New Universal Atlas. 60pls. John Cary, London.

Della Bruna, C., E. Gallo, V. Sbordoni, 2013: Guide to the Butterflies of the Palearctic Region. Pieridae part I (Second Edition). Omnes Artes, Milano.

NII-Electronic Library Service

The Lepidopterological Society of Japan

Gray, D., 1856. *List Spec. Lep. Ins. Brit. Mus.* **1**: 92.

Hewitson, W. C., 1853. Illustration of new species of exotic butterflies, selected chiefly from the collections of W. Wilson Saunders and William C. Hewitson. 1 :[8], pl. Pieris II, f. 15,16.

Huang, H., 1995. Five new butterflies from S. W. Tibet. Neue Ent. Nachr., 41: 271-287.

Röber, J., 1906. Pieris. In Seitz, A.(ed.), The Macrolepidoptera of the World 1: 48, pl. 21. Fritz Lehmann Verlag, Stuttgart.

Tadokoro, T., Y. Koide and K. Hori, 2014. Description of a new subspecies of *Mesapia peloria* from central Nepal, and taxonomic notes for other subspecies (Lepidoptera, Pieridae). *Lep. Sci.* **65** : 51-59.

Verity, R., 1905-1911, Rhopalocera Palaearctica, iconographie et description des Papillons Diurnes de la region palearctique, Priv. Publ., Florence

Ziegler, H., 2007. Revision von *Mesapia peloria* (Hewitson, 1853) mit Beschreibung einer neuen Unterart aus China (Lepidoptera, Pieridae). *Atalanta* **38**: 157-170.

Zegler, H., 2015. H. Zeigler, Chur. Available from: http://www.euroleps.ch/

摘　要

*Mesapia peloria*のタイプ産地と分布（田所輝夫・王　敏・小出雄一・堀　勝彦）

*Mesapia peloria*は中国西部及びヒマラヤ山脈一帯の高山地帯に分布する1属1種の小型のシロチョウである. Tadokoro *et al.* (2014) は, *M. peloria*の分類を再評価し, 3つの地方型亜種の斑紋を紹介して仮の分布図を作製した(Fig. 1). 3亜種とは, 四川省産のssp. *peloria* (Fig. 4), 青海省産のssp. *lama* (Fig. 5) 及び新亜種で中央ネパール産のssp. *epsteina* (Fig. 6)である. Tadokoro *et al.* (2014) はその際ssp. *peloria*のタイプ産地であるMts of Chinese Tartaryがこれまで歴史的に考えられてきたように祁連山脈を指すのではなく寧ろチベット山脈を指すのではないかと推測したが, その地域の標本が不十分であったために判断を保留した. 最近我々は中央チベットから東チベットにかけた6ヶ所の地域で採集された個体群の標本を入手することができたので (Figs 2-3), それらを現在適格名とされている4亜種 (Figs 4-8) と比較することで亜種同定するとともにタイプ産地であるMts of Chinese Tartary (Fig. 10) の地域を特定して分布図のアップデイトを試みた. その結果, ssp. *peloria*のタイプ産地はやはり祁連山脈ではなくチベット山脈であることが示唆された. とりわけ中央チベットのTa-La産の個体群はタイプ標本に極めて近い斑紋を持つ. 分布図はFig. 11 のように補正された. また, 現時点でのシノニムリストを纏めた. なお, Tadokoro *et al.* (2014) では中央ネパール産亜種の記載の際に国際動物命名規約ではssp. *epsteini*とすべきところを誤ってssp. *epsteina*と命名してしまった事に関し, この場を借りて故Epstein博士とご家族の方々にお詫び申し上げる.

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